Space Weather Forecast

Issued on Friday, 22 July 2022 at 01:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor Storms likely today (22nd) and expected tomorrow (23rd), with a chance of Moderate storms tomorrow. Slight chance of Moderate flares (R1-R2 Radio blackouts) throughout. Earth-directed Coronal Mass Ejection (CME) expected early tomorrow.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the last 24 hours. There are currently eight active sunspot regions on the visible disc. However, none currently display any significant geomagnetic complexity, or have shown any significant change in spot size or area, only producing frequent Common lass flares. The largest of these flares occurred late in the period, from a sunspot just behind the west limb. An earlier medium sized Common-class flare occurred near center-disc, and his triggered a filament eruption (arc of plasma), which launched a CME (Coronal Mass Ejection), which has since been diagnosed as being Earth-directed. No other Earth-directed CMEs were observed.

Solar Wind / Geomagnetic Activity: The solar wind was steady at background levels with speeds near 370km/s until around 21/1600 UTC, when a small increase occurred and the solar wind reached slightly elevated levels. The solar wind peaked at 466 km/s at 21/1658 UTC. The total strength of the magnetic field was at moderate to strong levels. The important north-south component (Bz) was initially unremarkable, but from 21/1400 UTC started fluctuating, to range between strongly positive and also strongly negative. These solar wind parameters are believed to indicate the arrival of an enhanced solar wind environment, from one or more coronal holes. The net result of these solar wind measurements was initial Quiet geomagnetic activity increasing to reach Minor storm levels between 21/1500-2100 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Despite a large number of active regions, activity is expected to remain predominantly Low, with a slight chance of isolated Moderate class flares through the period.
Solar Wind / Geomagnetic Activity: Initially a weakly enhanced solar wind environment is expected. Then either late today, or more likely early tomorrow, an Earth-directed CME is expected to arrive. Geomagnetic activity is expected to be Unsettled to Active for much of today, with a chance of isolated Minor Storm intervals at first. With the CME arrival tomorrow (23rd) Minor Storms are expected to develop, with isolated Moderate geomagnetic storm intervals likely. During days 3 and 4 (24th and 25th) a gradual decline in activity is expected, reaching Quiet to Unsettled conditions by late day 4.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Met Office Space Weather Forecast

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) may increase due to any flares that occur, however there is only a very slight chance of reaching the level of a solar radiation storm.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	60	80	20	10
Strong	G3	No	1	10	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	10	10	10	10
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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